



Försättsblad Prov Original

Kurskod	Provkod	Tentamensdatum
K E 0 2 6 G	T 2 0 1	2 0 1 9 - 0 2 - 1 5
Kursnamn	Kemi GR (A), Teknisk kemi	
Provnamn	Material- och energibalanser	
Ort	Sundsvall	
Termin		
Ämne		

Omtenta: Energi och materialbalans

Kurs kod: KE026G

Datum: 15 februari 2019

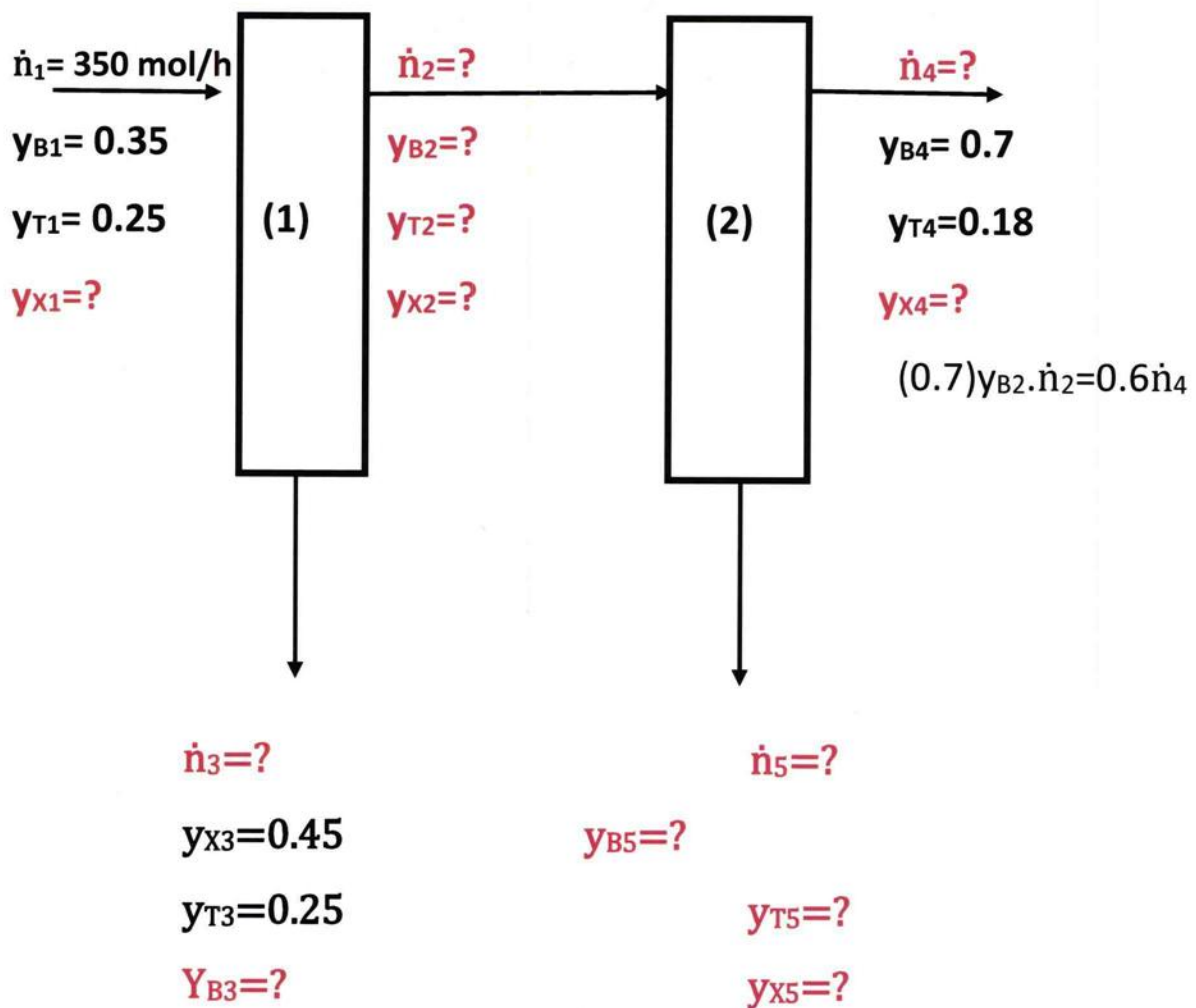
Klockan: 08:00- 13:00

Tillåtna: Penna, miniräknare, suddgummi

Tabeller (i A4), 4 diagram (i A3 format) och formelsamlingen (i A4) får ni av oss

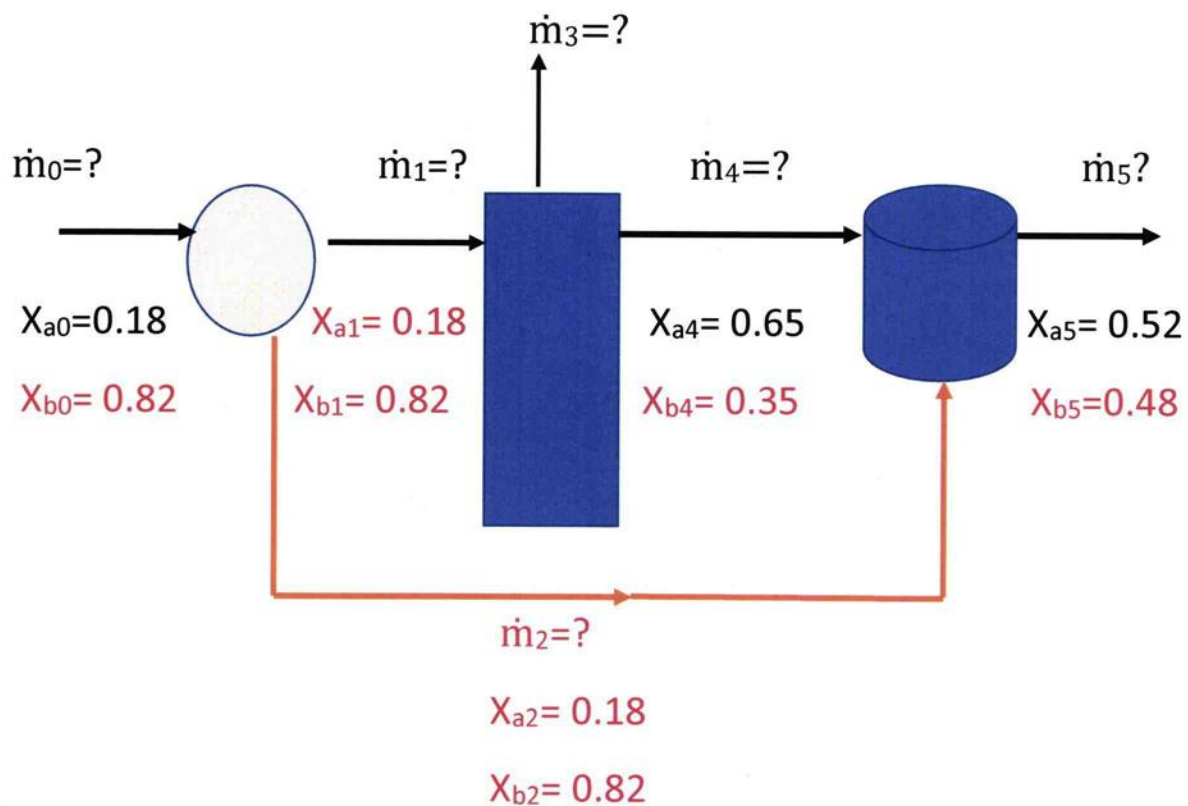
Material balance for several reactors

Calculate all unknowns: (30 Poäng)



$$(0.75) (y_{X1})(\dot{n}_1) = (0.8)\dot{n}_3$$

Bypass: calculate all unknowns even bypass percentage (20 poäng)



Energy balance inclusive chemical reaction (15)

- Use heat of formation (ΔH_f) to calculate the heat of reaction (ΔH_{rxn}) of n-Octane:
- n- C_8H_{18} (g) + $17/2 O_2$ (g) \rightarrow 8 **CO** (g) + 9 H_2O (L) $\Delta H_{rxn} = ?$

(Kommentar: titta även på tillståndet av varje ämne när du läser ΔH_f från tabellen!)

b) Suppose that the **reaction is reversed** and the mole flow rate of the CO in an open system reactor is 500 mole/s. How much heat is needed in Kw?

Energy balance inclusive phase change (20 poäng)

n-Hexane (liquid) with 400 mol/s enters a boiler at 20 °C and 1 atm and the outlet is n-Hexane (vapor) at 80 °C and 1 atm. How much heat was added to the boiler in KW.

Comments: (For solution, you need to use both table B1 and B2)

Real gases (15 poäng)

A gas cylinder contains Nitrogen gas at 176, 68 K and 83, 75 atm. If the weight of the gas is 10 kg, how much is the volume of the cylinder in liter. The gas condition is not ideal. Use compressibility factor to calculate the volume.

Jan Pourian

Lycka till